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NUCLEAR MAGNETIC RESONANCE METHOD OF DETECTING AND MONITORING THE FLOCCULATION KINETICS OF HEAVY FRACTIONS OF A COMPLEX FLUID

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BACKGROUND OF THE INVENTION

Field of the Invention

The invention relates to a nuclear magnetic resonance method of detecting and monitoring the flocculation kinetics of high molecular weight fractions of a complex fluid.

Description of the Prior Art

Flocculation and deposition processes pose considerable problems in the petroleum industry. In particular for heavy oils, components of very high molar mass (asphaltenes, resins) are often the cause of such processes which may appear in porous media during production as well as during transportation. Flocculation is the formation of molecular aggregates of micronic size leading to sedimentation or deposition that can considerably modify the fluid flow, either by reduction of the section of flow or by viscosity increase. Furthermore, the intrinsic charge of some components (for example asphaltenes) generates a high tendency to cling to the charged surfaces.

The thermodynamic parameters which govern the flocculation processes are numerous (composition, pressure, temperature) and the complexity of the molecular structures involved make prediction and modelling very uncertain. Similarly, certain recovery methods (CO2 injection, acidizing) may modify the fluid equilibria and bring